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ABSTRACT

This report addresses three major issues concerning the Army's program for developing extension training materials: (1) indications of low usage of Army Training Extension Course lessons by soldiers in the field; (2) improvements needed in the process for developing extension training materials; and (3) the need for further evaluation before the Army commits itself to procuring and fielding a new videodisc electronic information delivery system programmed to cost approximately $127.3 million. The document begins with a letter from Frank C. Conahan, Director of the U. S. General Accounting Office (GAO) to John O. Marsh, Jr., the Secretary of the Army, which provides a critique of the Army's Extension Training Program, recommends further evaluation before purchase is made of new videodisc equipment, and introduces the four appendices that make up the major part of the document. Appendix I provides background information on extension training materials; the objectives, scope and methodology of this study; and major findings of the study. Appendix II consists of a letter from the Senior Associate Director of the U.S. General Accounting Office expressing concern over whether the acquisition plans for videodisc equipment are justified based on the low usage of current training materials by soldiers in the field. Appendix III contains a letter from the Principal Deputy Assistant Secretary of Defense in response to the GAO report "Observations on Army's Plan to Buy an Electronic Video-Disc Delivery System," also included in Appendix III. The final appendix consists of the GAO draft report, "Improvements Needed in the Army's Program for Developing Extension Training Materials for Use by Soldiers in Field Units," which contains five findings and four recommendations and the Department of Defense's reaction to each. A letter from the Department of Defense in response to the draft GAO report is also provided. (JB)

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BY THE U.S. GENERAL ACCOUNTING OFFICE

Report To The Secretary Of The Army

U.S. DEPARTMENT OF EDUCATION
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Improvements Needed In The Army's Program For Developing Extension Training Materials For Use By Soldiers In Field Units

The Army has about 16,000 different training materials--such as soldiers manuals and audio-visual materials--and plans to add about 24,500 more training items and several thousand video-disc systems to provide training in field units. Because these materials will cost millions of dollars, GAO reviewed the Army process for determining its training material needs and its justification for the new video-disc system.

GAO found that the Army had not established acceptable usage levels for its training materials, had not obtained field unit input on unit needs for training materials, and had not identified the usage and effectiveness of individual training materials. Also, the Army has not sufficiently demonstrated its need for the large numbers of video-disc equipment it plans to acquire for use in the field. GAO recommends that the Army (1) take several actions to improve its needs determination process for training materials and (2) further evaluate the planned video-disc system procurement.

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

B-218667

The Honorable John O. Marsh, Jr.
The Secretary of the Army

Dear Mr. Secretary:

We have reviewed the Army's program for developing extension training materials to improve individual soldier proficiency in field units. This report addresses (1) indications of low usage of Training Extension Course lessons by soldiers in the field, (2) improvements needed in the process for developing extension training materials, and (3) the need for further evaluation before the Army commits itself to procuring and fielding a new video-disc electronic information delivery system programmed to cost about $127.3 million.

As you know, the U.S. Army Training and Doctrine Command (TRADOC), through its service schools, develops training materials for (1) resident school training of soldiers and (2) support of unit and individual soldier training--commonly referred to as extension training. Each school determines the type, quality, and quantity of training materials within assigned military occupational specialties. TRADOC's U.S. Army Training Support Center is the overall program manager for developing extension training materials.

Currently, about 16,000 different materials, such as soldiers manuals and audio-visual materials, are available for use by soldiers in troop units. About 24,500 more are under development or are planned for future development at a cost of many millions of dollars.

Costs to develop extension training materials are not identified and budgeted separately. For development of both resident and extension training materials, TRADOC spent about $92 million and $105.7 million in fiscal years 1983 and 1984, respectively. TRADOC estimated that the average cost to develop certain categories of materials we reviewed generally ranged from $2,000 for television audio-visual tapes to about $7,000 for each Training Extension Course lesson and $20,000 to $40,000 for development of each motion picture film.

ARMY STUDIES AND AUDITS INDICATE LOW USE OF TRAINING EXTENSION COURSE LESSONS

Training Extension Course lessons are designed to teach specific tasks, such as assembling an M16 rifle, operating a gasoline lantern, and setting up a mobile kitchen trailer. Army studies, audits, and other data since 1979 have characterized usage as low for the Training Extension Course lessons. This low usage has precipitated questions about the need for these materials. However, the Army does not have criteria specifying what are acceptable usage levels for individual training materials or categories of materials. Furthermore, the Army does not obtain routine feedback to reflect the usage levels for individual extension training materials or their effectiveness.

None of the studies, audits, or surveys fully explored the reasons for what was characterized and reported as low usage levels. Some studies did, however, conclude that factors other than need for training or the training materials, such as limited command emphasis, could impact usage levels. The indicated low usage of the materials cannot be attributed solely to or equated with a lack of need for training or for a particular type of training material, such as extension training materials. But we believe questions about the causes for low usage and what is meant by low usage cannot be adequately addressed until criteria are available defining acceptable usage levels and data is systematically collected on individual training materials usage levels and the reasons for those levels.

An ongoing Army survey of several thousand soldiers will again identify overall usage levels for the Training Extension Course program, but it will not identify the usage level or effectiveness of individual lessons.

PROCESS FOR DEVELOPING EXTENSION TRAINING MATERIALS NEEDS IMPROVEMENT

The Army has initiated actions to improve its process for developing extension training materials by issuing guidance for their development and by making the above-mentioned materials usage survey. In addition, the Department of Defense, on October 2, 1984, in a response (app. III) to our July 11, 1984, report (app. II) on the planned procurement of new video-disc equipment, stated that lessons learned from various studies and surveys had been used to develop plans to improve program management. However, we believe TRADOC needs to further improve its method

for determining the need for extension training materials before it spends the millions of dollars planned for developing additional training materials.

Program guidance issued by TRADOC states that the materials must be needed and wanted by field units. However, we found that the TRADOC schools are not obtaining field unit input on their needs and desires for extension training materials. The schools are developing the materials on the basis of their identification of critical tasks associated with a military occupational specialty and the application of a needs analysis procedure to each task. According to TRADOC's guidance, the key determinations to be made during the application of the needs analysis procedure include (1) whether the task can be taught sufficiently well without training materials, (2) whether existing materials can satisfy the need, and (3) what kind of product should be developed if new materials are required.

Although the needs analysis procedure in TRADOC's guidance states that an extension training material should be developed only if it is required and meets the stated needs of field units, the procedure does not specify how actual or stated needs are to be defined or how the schools are to determine field needs. We believe TRADOC needs to define what the determination of field needs for training products means and include in its guidance procedures for obtaining field unit input in determining the need for extension training materials.

Given the indicated low use and the large number of training materials planned and under development, the Army needs to ensure that lessons learned from usage of extension training materials previously fielded are considered before proceeding with its planned large-scale effort to develop new materials, many of which are for new or revised military occupational specialties related to systems under development. In doing this, the Army also needs to obtain user feedback on individual materials and to develop criteria which define acceptable extension training materials usage levels. Key indicators are whether the products are used and improve soldier proficiency.

FURTHER EVALUATION NEEDED BEFORE ARMY BUYS AND FIELDS NEW VIDEO-DISC EQUIPMENT

The Army plans to procure a new video-disc electronic information delivery system to replace existing paper and other audio-visual delivery systems. About $127.3 million has been programmed to procure this system and to develop and convert training materials to video-disc in fiscal years 1984-90. In

our July 11, 1984, report (app. II), we expressed our concerns about these planned expenditures because

--over 80 percent of the 20,000 units of video-disc equipment in the approved acquisition objectives are for use by soldiers in the field and

--the justification for the purchases did not include an analysis of past extension training materials usage.

The Department of Defense commented on our report (app. III) as follows:

1. Army analysis of extension training material usage was continuous and would influence the fielding plan for the new video-disc system.

2. Procurement of the video-disc hardware was scheduled first for Army schools and was not scheduled for field units until fiscal year 1987; the largest buy was scheduled for fiscal year 1990.

3. Procurement would be cut, if the video-disc system had not proven itself. With respect to the system proving itself, DOD stated that pilot fielding of video-disc lessons to units indicated favorable acceptance and usage levels and that additional validation of the equipment would occur in the school setting prior to fielding in fiscal year 1987.

4. Usage was only one of several factors to consider in determining requirements for extension training. Other factors included the number and types of tasks taught during initial entry at training centers and schools compared with those which must be taught by the Active and Reserve component organizations to which individuals were assigned.

5. Video-disc training materials would be distributed on the basis of user demand. In addition, the number and types of equipment would be based on factors such as expected usage of the training materials and scheduling of the skill qualification test for assigned personnel.

We agree that Army analysis of extension training material should be continuous and that the actions planned to further evaluate the need for large numbers of the video-disc equipment are steps in the right direction. However, we believe that

the Army needs to proceed cautiously in procuring the new video-disc system for field use until after (1) it has field tested the new equipment and (2) it has made the needed management improvements in the program for developing extension training materials. We believe that the results of these improvements should be incorporated in the reevaluation of the need for large numbers of video-disc equipment because (1) criteria for acceptable usage levels have not yet been established, (2) adequate data is not now available on the use and effectiveness of extension training materials, and (3) plans to further evaluate user acceptance of the video-disc equipment in service schools where use is required will not, in our opinion, provide sufficient indications of how it will be used by soldiers in field units. According to the Army, only a small supply of video-disc equipment will become available before fiscal year 1989 for field use and evaluation. The first large-scale procurement is for fiscal year 1989.

RECOMMENDATIONS

We recommend that to improve the extension training materials program, you direct the Commander, U.S. Army Training and Doctrine Command, to

- --develop criteria for what is to be considered an actual or a stated field need for extension training materials to include what are acceptable usage levels for the materials,

- --delineate procedures in TRADOC guidance which specify (1) how schools should obtain field input on actual needs and (2) how this input is to be used in developing materials, and

- --obtain feedback on individual training materials usage and effectiveness for the purposes of incorporating lessons learned into the development of requirements for new extension training materials and determining the need to revise existing materials.

Concerning the Army's plans to procure the new video-disc equipment units for field use, we recommend that you reevaluate the fiscal year 1989 procurement plan using test results of field use and need. This evaluation should consider (1) the usage levels for extension training materials and the reasons for such usage and (2) the status of other management improvements needed in the program for developing such materials, such as the development of criteria defining acceptable usage levels and improvements in the criteria and procedures for determining field needs for extension training materials.

AGENCY COMMENTS AND OUR EVALUATION

On May 16, 1985, DOD commented on the draft of this report (app. IV). DOD concurred in the recommendations concerning improvements needed in the extension training materials program and stated that TRADOC would be tasked with

--developing criteria for identifying field needs and defining acceptable usage levels;

--reviewing and improving its procedures for training materials development to include procedures for obtaining field input on training materials needs and guidance on how this input would be used in developing materials; and

--ensuring, as part of this review, the systematic checking of training materials use and effectiveness and periodically assessing the effectiveness of the feedback procedure in ensuring materials and program effectiveness.

DOD also concurred in our recommendation on the need for ensuring that the Army's reevaluation of the planned procurement of new video-disc equipment units for field use include consideration of the usage levels for extension training materials and the status of other management improvements needed in the program for developing such materials. But DOD did not agree with our original proposal that the Army reevaluate the planned procurements for field units before distributing the video-disc equipment to the field in fiscal year 1987. DOD commented that the proper time for assessing the Army's video-disc field support program would be fiscal year 1989 after a small supply of initial training materials and equipment would become available for field use and evaluation. DOD agreed to (1) limit the initial fiscal year 1986 video-disc equipment procurements for field units to the small quantity required to test actual field use and needs and (2) reevaluate the field needs for the equipment before the planned large-scale procurements in fiscal year 1989.

We believe the actions taken and planned will bring about the desired improvements in the extension training materials program and help ensure that only those products needed are developed and retained. Also, we believe the Army's plans to field test a small number of the new video-disc equipment will help ensure that the system is procured only if it is demonstrated that the equipment is needed and will be effectively used by soldiers in the field.

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Our findings are discussed in more detail in appendix I.

As you know, 31 U.S.C. § 720 requires the head of a federal agency to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Committees listed above; the House and Senate Committees on Armed Services; the Director, Office of Management and Budget; and the Secretary of Defense.

Sincerely yours,

Frank C. Conahan

Frank C. Conahan
Director

IMPROVEMENTS NEEDED IN THE ARMY'S PROGRAM FOR DEVELOPING EXTENSION TRAINING MATERIALS FOR USE BY SOLDIERS IN FIELD UNITS

BACKGROUND

The U.S. Army Training and Doctrine Command (TRADOC), through its service schools, develops training materials for (1) resident school training of soldiers and (2) support of unit and individual soldier training--commonly referred to as extension training.[1] These schools determine the type, quality, and quantity of training materials. Each school has the responsibility within assigned military occupational specialties. For example, the transportation school is responsible for military occupational specialties, such as truck drivers and watercraft operators. TRADOC's U.S. Army Training Support Center at Fort Eustis, Virginia, is the overall program manager for developing extension training materials.

The primary purpose of extension training materials is supporting training in troop units in both Active and Reserve components. These materials include items such as training devices, correspondence courses, field manuals, soldier manuals, Training Extension Course (TEC) lessons, audio-visual materials (educational television tapes and motion picture films), graphic training aids (charts, cards, and other materials), and resident training materials provided to units. TEC lessons are designed to teach specific tasks, such as assembling and disassembling an M16A1 rifle, setting up a mobile kitchen trailer, and operating and maintaining a gasoline lantern.

Development of extension training materials has been under way for many years. There are now about 16,000 different extension training materials in inventory, and 24,500 more are under development or are planned for future development.

Costs to develop extension training materials are not identified separately from development of resident school training materials. TRADOC spent about $92 million in fiscal year 1983 and about $105.7 million in fiscal year 1984 for developing resident and extension training materials. According to information provided by TRADOC, the materials being produced in fiscal

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[1]Extension training is training performed in field units. Materials developed by Army schools and exported to the units for this purpose are referred to as extension training materials.

APPENDIX I

year 1983 were predominantly extension training materials. Also, information provided by TRADOC showed that estimated costs to develop the categories of materials[2] we reviewed generally range from $2,000 for television audio-visual tapes to about $7,000 for each TEC lesson. Costs to develop motion picture films average from $20,000 to $40,000 each.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our primary objective was to evaluate the Army's system for determining requirements for extension training materials. Additionally, we reviewed the Army's justification for its plans to field a new video-disc electronic information delivery system.

For our review of requirements for extension training materials, we selected three categories of extension training materials--TEC lessons, audio-visuals, and graphic training aids--because Army studies, audits, and other data indicated low usage of these materials by soldiers in field units. These categories represent over 50 percent of all extension training materials fielded and planned.

In performing our fieldwork from January to September 1984, we visited Army Headquarters; TRADOC; and the following 7 of 24 schools, which were selected at random and represent a cross section of TRADOC schools:

Combat arms:

Infantry, Fort Benning, Georgia
Air Defense Artillery, Fort Bliss, Texas

Combat support:

Aviation, Fort Rucker, Alabama
Signal, Fort Gordon, Georgia

Combat service support:[3]

Quartermaster, Fort Lee, Virginia

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[2]Estimated development costs for graphic training aids were not provided.

[3]We originally selected two schools in each category, but because of a recent organizational change which resulted in the addition of another school at Fort Eustis, our review was conducted at three combat service support schools.

Aviation Logistics, Fort Eustis, Virginia
Transportation, Fort Eustis, Virginia

In our work on the system for determining requirements for extension training materials, we interviewed Army Headquarters and TRADOC personnel and reviewed regulations and records on guidance for determining need for developing extension training materials. At the schools, we interviewed personnel who determine the need for training materials and reviewed trip reports of visits to field installations and other documentation on the systems and procedures for determining need for extension training materials.

We also obtained information on training materials usage from Army studies, audits, and other data reflecting training materials usage. Because TEC lessons represented a large portion of the total materials--about 30 percent of all fielded training materials and about 55 percent of those in the three categories reviewed--we limited our review of training materials usage to that available for these lessons. We did not verify the data and figures in the Army studies and audits reflecting usage of training materials. In addition, we visited the U.S. Army Forces Command Headquarters and two of its installations--Fort Bragg, North Carolina, and Fort Carson, Colorado--to interview commanders and enlisted personnel to obtain a user perspective on the training materials. We did not assess the quality or effectiveness of individual materials.

Concerning the Army's proposed procurement of video-disc equipment, we interviewed personnel at Army Headquarters and TRADOC and reviewed the requirements documentation and other supporting records for the planned procurement.

Our review was performed in accordance with generally accepted government audit standards.

LOW USE OF TRAINING MATERIALS RAISES QUESTIONS ABOUT THE NEED FOR THE MATERIALS

Data is not routinely collected on extension training materials usage. However, the Army has expressed concern over the large numbers of extension training materials, and several Army studies and audits conducted since 1979 have classified usage as low for the TEC lessons. In 1980, there were about 20,400 extension training materials. An Army effort to reduce the extension training materials inventory by 50 percent resulted in the elimination of 6,635 different items, or about 33 percent, of the then-existing materials, leaving an inventory of about 14,000 materials.

A 1979 Army Research Institute study showed that (1) about 50 percent of the 3,284 soldiers who responded to questionnaires had used TEC materials and (2) 82 percent of recorded uses for selected units during a 2-month test period were directed by unit commanders. This study concluded that some factors contributing to what is considered to be low usage may have been ignorance about the program by some soldiers, a low level of command emphasis, and the unavailability of the materials in the units. The study stated that these factors could have their greatest impact on the voluntary, individual type of use for which the program was designed. It also concluded that this could explain why most identified uses were mandatory and were by groups.

More recent Army studies and audits have also disclosed limited use of TEC lessons. For example, in 1982, the Army Audit Agency reported that use of TEC lessons at the 5th Infantry Division, Fort Polk, Louisiana, was very low. It reported that

--52 of 90 soldiers interviewed had never used the materials and 21 had never heard of them;

--7 of 44 companies had included the materials in their training schedules, but in these 7 companies, the materials were scheduled for use on 36 of 441 available training days; and

--the average number of soldiers using these materials each month was generally very low compared with the battalion strength level--from 5 to 22 percent for 5 battalions and 42 percent for the sixth battalion reviewed.

A July 1982 report based on a TRADOC Systems Analysis Activity study of training effectiveness for the new Hawk missile system found that while from 71 to 79 percent of 1,506 soldiers in five Hawk-missile-related military occupational specialties liked the TEC lessons, only 32 to 56 percent had actually completed them. As did other studies, this study concluded that extension training materials were viewed in a positive manner but the usage seemed low.

The U.S. Army Training Support Center sponsored a 1982 survey on TEC lesson usage. The survey was conducted by the Military Personnel Center. The survey showed that 47 percent of 3,521 officers and 43 percent of 12,111 enlisted personnel surveyed had not used the lessons during the previous 12 months. Because of the Center's concern over the indicated low usage levels, it initiated another survey of the usage of these lessons which included a statistical sample of several thousand personnel

in the Active, Reserve, and National Guard components of the Army. Although the results of this survey were originally due in April 1984, the Army was continuing its review of the results at the time of our review. This survey will show overall indications of usage of training lessons; it will not assess the use and effectiveness of individual lessons.

While the indicated low usage levels can raise questions about the need for these extension training materials, such low use cannot be attributed solely to a lack of need for training or for certain types of training materials. None of the studies or audits specifically addressed the need for these extension training lessons or the reason for the usage levels identified. They did, however, state that other factors, such as soldier awareness, command emphasis, and availability of materials, can influence the usage level. Nevertheless, we believe the consistent results of the studies, surveys, and audits over the last 5 years showing low usage indicate the Army needs to (1) define what acceptable usage levels are, (2) obtain feedback on usage levels and reasons for the usage, and (3) use this information as appropriate to improve the method for deciding to develop materials and/or ensure necessary use by the soldiers.

THE ARMY NEEDS TO IMPROVE THE PROCESS FOR DEVELOPING EXTENSION TRAINING MATERIALS

TRADOC may be developing and revising extension training materials that are not needed or that may not be used sufficiently to justify their cost. More specifically, we found that the schools are not developing extension training materials on the basis of actual field needs as required in TRADOC's December 1982 guidance. Although the guidance discusses determining need for training support, it does not specify how schools should obtain and use input on actual field needs. In addition, the Army has not established an adequate feedback system for use in assessing the effectiveness and determining the usage level of extension training materials once they have been developed.

In view of several factors--(1) the earlier attempt to eliminate half of the then-existing materials, (2) the consistent indications of low usage of materials in the field based on the Army's evaluations, and (3) the thousands of extension training materials under development and programmed for future development--we believe the Army needs to (1) specify how input on actual field training needs is to be obtained and used before materials are developed and (2) establish a system for obtaining information on their use and effectiveness. We believe that

unless these improvements are made, TRADOC will continue to develop and revise extension training materials for which there is little assurance of need.

Decisions to develop extension training materials should consider actual field needs

TRADOC's schools plan to spend millions of dollars developing thousands of extension training materials on the basis of a specified task analysis. The task analysis approach does not specifically query field units regarding their need for these materials, even though the December 1982 TRADOC guidance specifies that the materials must be needed and wanted by field units.

TRADOC's December 1982 guidance states that (1) new requirements for training support must be determined only after careful consideration of the actual needs of field units, (2) the materials must be usable, and (3) particular emphasis must be placed on the ability of units to effectively use the materials and services. The guidance provides for a front-end analysis to be performed for each military occupational specialty which results in the identification of critical tasks to be taught in the unit. The guidance then provides for step-by-step procedures, called a needs analysis procedure, to be applied to each critical task to determine requirements for extension training materials.

According to the guidance, the key determinations to be made during application of the needs analysis procedure to each critical task are (1) whether the task can be taught sufficiently well without training materials, (2) whether existing materials can satisfy the need, and (3) what kind of product should be developed if new materials are required. Although the needs analysis procedure states that an extension training material "should be developed only if it is required and meets the stated needs of field units," the procedure does not specify how the schools are to determine field needs. While it does address the use of evaluation exercises, such as the skill qualification test,[4] in the determination, the guidance does not define an actual or a stated field need.

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[4]A performance-oriented test used to measure individual proficiency in performing critical tasks related to a soldier's primary military occupational specialty.

Generally, school personnel who develop training products told us they decide to develop extension training materials on the basis of the steps in the needs analysis procedure without obtaining field input on their training needs. They said that only in rare instances did they receive requests from field units for development of extension training materials.

Personnel at the schools we visited identified two potential sources of field input on need for materials--periodic visits to field units by school personnel and the rotation of personnel from field units to the schools. However, except for those few instances when field units asked for training materials, the schools could not provide any documentation from the trip reports on their visits or otherwise showing where actual training needs of field units had been identified from these sources.

Even though the school personnel stated that the front-end analysis is performed to identify critical tasks and that the needs analysis procedure is applied to each task, they said they automatically program for development all those identified critical tasks for which extension training materials are not already available. Furthermore, the TEC lessons are distributed to units on the basis of the assigned military occupational specialties through what the Army calls a "push" system, rather than determining requirements based on user demand. Audio visuals and graphic training aids are distributed to the approximately 136 Training and Audio Visual Support Centers worldwide where units and individuals can request those materials from the centers.

Without field input on training needs, materials could be developed which are not needed or do not meet user needs. The Army needs to establish procedures for obtaining this input so the schools can consider field needs when making decisions on developing training materials for them. Using techniques such as the visits to field installations, the Army should specify how actual needs of field units are to be defined, identified, and satisfied.

Improved program evaluation is needed for the extension training materials program

Closely related to the need for procedures specifying how field needs for developing extension training materials are to be defined, identified, and satisfied is the need for improved management evaluation of the extension training materials program. Systematic feedback on extension training materials to developers and managers could be very useful in future development efforts and in evaluating and improving overall program effectiveness.

Unlike the Army correspondence course training, the Army does not routinely receive data on other extension training materials usage and effectiveness. Personnel at the schools said they receive some feedback on product effectiveness when visiting units to validate completed training materials and on usage levels during periodic visits to field installations. However, this does not constitute systematic feedback, and school personnel could not identify specific uses made of or actions taken on the usage data.

The various Army studies, surveys, and audits have shown that training materials usage is generally low; these reports could serve as a basis for further evaluation of specific training materials. The Army does not have criteria for evaluating the extent of materials usage or for use in judging the relative merits of various usage levels.

We believe the Army needs to develop such criteria and obtain user feedback on individual materials. Furthermore, we believe the Army needs to ensure that lessons learned from usage of extension training materials previously fielded are considered before proceeding with its planned large-scale effort to develop new materials, many of which are for new or revised military occupational specialties related to new systems under development. In addition to being useful for overall program evaluation, such feedback would also be useful for determining the need to retain and/or revise existing materials in units. Currently, the schools periodically review fielded training materials and revise them if doctrine or equipment changes. This is done without considering actual use of the materials. We believe a more complete evaluation loop for training materials provided by information on individual materials usage and effectiveness would help ensure that training resources are not expended unnecessarily.

APPENDIX II

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

JUL 11 1984

The Honorable Delbert L. Spurlock
The Assistant Secretary of the Army
(Manpower and Reserve Affairs)

Dear Mr. Spurlock:

Subject: Observations on Army's plan to buy an electronic video-disc delivery system (GAO/NSIAD-84-140)

As part of our current review of the Army's program for developing soldier training materials (code 967106), such as training extension course lessons, we have inquired about Army plans to purchase new training equipment. The purpose of this letter is to bring to your attention our concern over whether the acquisition plans for video-disc equipment are justified based on the low usage of current training materials by soldiers in the field.

BACKGROUND

The Army has programmed about $140 million for procurement of an electronic video-disc delivery system, as well as the development and conversion of training materials to video-disc, for fiscal years 1985 through 1990. Life-cycle cost of the equipment over the next 20 years is estimated to range as high as $388 million (adjusted for inflation) for the 20,000 units in the approved acquisition objective. Over 80 percent of equipment that the Army plans to buy by 1990 are for use by soldiers in the field. According to personnel in the Army Communicative Technology Office[1]--which has initiated the acquisition of the new video-disc system--total equipment units could reach 40,000 if the Army fields the system worldwide and adapts it to other applications such as maintenance and repair.

Army Communicative Technology Office personnel told us that the first 920 equipment units to be purchased are for the Army's training schools and that about 17,000 of the remaining 19,080

[1]This is a joint U.S. Army Materiel Development and Readiness Command/U.S. Army Training and Doctrine Command office colocated with the Training and Doctrine Command's Army Training Support Center at Fort Eustis, Virginia.

units will be placed in troop units beginning in fiscal year 1987. Technology Office personnel also told us that about $900,000 will be spent this fiscal year for development and conversion of training materials to video-disc and that about $25 million has been programmed for this purpose for fiscal years 1985 through 1990.

According to Communicative Technology Office officials, the new equipment will reduce the present volume of paper training materials and will provide

--a standard information delivery system with high density storage and rapid access capability to replace the paper and other existing audio visual delivery systems,

--the latest state-of-the-art in information delivery, and

--interactive programmed instructions and simulation to the user (for example, the user can automatically reverse the materials for replay or skip materials).

SOLDIERS USE OF TRAINING MATERIALS

Our concern about the justification for the new equipment and conversion of training materials to video-disc format centers around the decision to provide a large amount of training equipment to troop units even though the Communicative Technology Office has not analyzed soldiers' past usage levels of training materials. This concern is heightened by studies and other data obtained during our review which indicates that soldiers do not use a large portion of available training extension course materials.

According to Communicative Technology Office officials, the decision regarding the number of equipment units to be placed in troop units was based on providing each battalion in both the active Army and reserve components with four units (one equipment unit per company level troop unit) and not on an analysis of training materials' usage levels.

Our review of training materials' usage has been limited to an analysis of available data for one major type of extension training material--training extension course lessons. According to information provided by the Army Training Support Center, training extension course lessons represented about 31 percent of all extension training materials fielded as of May 1984. Although the Army has not established criteria for evaluating

the extent of training materials usage, it appears--on the basis of limited Army studies--that soldiers do not use these lessons extensively.

A 1979 Army Research Institute study showed that only about 50 percent of the soldiers surveyed through questionnaires had used training extension course materials. The study also showed that 82 percent of recorded uses for selected units during a 2-month period were directed by commanders.

More recent Army studies have also disclosed limited use of training extension course lessons. For example, in 1982 the U.S. Army Audit Agency reported that use of training extension course lessons at the 5th Infantry Division, Fort Polk, Louisiana, was very low. It reported that

--52 of 100 soldiers interviewed had never used the materials, 21 had never heard of them;

--only 7 of 43 companies had included the materials in their training schedules, and then in only 36 of 441 available training days; and

--the average number of soldiers using these materials each month was generally very low compared to the battalion strength level--from 5 to 22 percent for 5 battalions, and 42 percent for the sixth battalion reviewed.

The Army Training Support Center is conducting another training extension course lesson usage survey which is scheduled for completion later this year.

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In conclusion, in view of the lack of a thorough analysis of the various types of training materials' usage levels, it appears that there is an inadequate basis for the Army to determine how many equipment units to buy and what types of training materials to convert to video-disc. We believe that low usage levels may be more indicative of a lack of need for the training materials being furnished to units in the field than to a deficiency in the type of system used to present the material. Therefore, there may be little reason to believe that the acquisition of new video-disc equipment will result in increased training materials' usage. Our continuing review of the Army's program for developing soldier training materials will address the question of identified training material needs.

We have discussed this concern with personnel in the Training Directorate, Deputy Chief of Staff for Operations and Plans, Department of the Army; and the Communicative Technology Office. If you desire, we would be glad to discuss this further with you.

We would appreciate being advised of your views on the matters discussed in this letter as well as any actions that you may plan to take. We are sending a copy of this letter to the Secretary of the Army.

Sincerely yours,

Henry W. Connor
Senior Associate Director

THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

MANPOWER, INSTALLATIONS AND LOGISTICS

2 OCT 1984

Mr. Henry W. Conner
Senior Associate Director
National Security and International Affairs Division
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Conner:

This is the Department of Defense response to GAO Final Report, subject: Observations on Army's Plan to Buy An Electronic Video-Disc Delivery System, No. GAO/NSIAD-84-140, dated July 11, 1984 (GAO Code No. 967106), OSD Case No. 6559.

The GAO Report addresses Army plans to buy an electronic video-disc system and to produce extension training materials for delivery by video-disc. The report observed that acquisition plans for video-disc equipment may not be based on a validated need, given low usage of current training materials by soldiers in the field.

Plans for the Electronic Information Delivery System (EIDS), when finalized, will assure that the number of systems procured are compatible with expected usage levels. Hardware delivery will be synchronized with the distribution of video-disc based training materials. This system is programmed over a five-year period with the initial procurement of 820 sets in FY 86. The largest number of sets (12,880) is to be acquired in FY 90. Should EIDS usage prove to be lower than projected after initial fielding, procurement levels will be appropriately reduced. The DoD position on the findings is enclosed.

There is every reason to expect that the fielding of EIDS will provide the Army with a cost effective means to undertake sustainment training, especially for perishable and highly technical skills.

Sincerely,

Jerry L. Calhoun
Principal Deputy Assistant Secretary of Defense
(Manpower, Installations & Logistics)

Enclosure

GAO FINAL REPORT - NO. GAO/NSIAD-84-140 - DATED JULY 11, 1984
(GAO CODE NO. 967106) OSD CASE NO. 6559

"OBSERVATIONS ON ARMY'S PLAN TO BUY AN
ELECTRONIC VIDEO-DISC DELIVERY SYSTEM"

* * * * *

FINDING

FINDING A: Army Has Programmed $140 Million For Procurement Of Electronic Video-Disc Delivery System To Be Used In Training. GAO found that the Army has programmed about $140 million for procurement of an electronic video-disc system, as well as the development and conversion of training material to video-disc for fiscal years 1985 through 1990. GAO also found that the life-cycle cost of the equipment for the next 20 years is estimated to range as high as $388 million (adjusted for inflation) for the 20,000 units in the acquisition approved objective. In addition, GAO found that over 80 percent of equipment that the Army plans to buy by 1990 are for use by soldiers in the field. (p. 9, GAO Letter Report).
[See GAO note, p. 16.]
DOD PARTIALLY CONCURS. Army has programmed $100.3 million to procure approximately 20,000 Electronic Information Delivery System (EIDS) sets over a period of five years starting in Fiscal Year 1986. There is $27 million programmed for the development, production and distribution of courseware to be delivered using video-disc during the period Fiscal Year 1984 to Fiscal Year 1990. It is planned to provide approximately 80 percent of the EIDS equipment to support distributed home station training for Active Army and Reserve Component soldiers.

FINDING B. Effect of Video-Disc on Paper Training Materials. GAO found that according to Army Communicative Technology Office (ACTO) officials, the new video-disc equipment will reduce the present volume of paper training materials. In addition, GAO reported ACTO claims that the video-disc will provide the following:

(1) A standard information delivery system with high density storage and rapid access capability to replace paper and other existing audio visual delivery systems;

(2) the latest state-of-the-art in information delivery; and

(3) interactive programmed instruction and simulation to the user (for example--the user can automatically reverse the materials for replay or skip materials). (pp. 9-10, GAO Letter Report)

APPENDIX III

DOD CONCURS. High density storage and rapid access of information capabilities of microprocessor controlled video-disc systems offers advantages over some paper based instructional materials for selected military applications. This technology is particularly useful where large volumes of technical information are to be presented, on call, to explain and demonstrate complex functions for operation and maintenance of highly technical equipment and weapons systems. While this type system is not appropriate for all information delivery applications, it can provide substantial savings over existing more costly methods when the courseware is properly designed, packaged and distributed to a specified target audience. Military Standards are being developed to ensure compatibility and interoperability of contract or in-house produced courseware with the microprocessor/video-disc hardware. With standard ports to connect peripheral equipment such as key boards, printers, computer discs and a modem, this system provides the flexibility to be tailored for many uses for many years to come.

FINDING C: Soldiers Use of Training Materials. GAO expressed concern that the justification for the new equipment and conversion of training materials to video-disc format centers around the decision to provide a large amount of training equipment to troop units even though the Army Communicative Technology Office has not analyzed soldiers' past usage level of training materials. GAO found through studies and other data that soldiers do not currently use a large portion of available training extension course materials. GAO concluded that in view of the lack of a thorough analysis of the various types of training material usage levels, there is an inadequate basis for the Army to determine how many equipment units to buy and what types of training materials to convert to video-disc. GAO further concluded that low usage levels may be more indicative of a lack of need for the training materials being furnished to units in the field than to a deficiency in the type of system used to present the materials. GAO finally concluded, therefore, there may be little reason to believe that the acquisition of new video-disc equipment will result in increased training materials, usage. (pp.10-11,GAO Final Letter Report)

DOD NON-CONCURS. Analysis of existing training material usage, such as the Training Extension Course (TEC), has been ongoing for several years by the US Army Training Support Center (USATSC), proponent schools, the Army Research Institute (ARI) and the HQDA Staff. User surveys have been conducted through the Army Personnel Center Survey System. The Lessons Learned have been used to develop plans to improve management, distribution of courseware and equipment procurement methods.

APPENDIX III

Usage level is only one of several factors to consider in determining requirements for extension training. Other factors include the number and types of tasks that are taught during initial entry at training centers and schools compared to those which must be taught by the Active and Reserve Component organizations to which individuals are assigned for duty. Training strategy impacts on the selection of the media to be used. The media selected is a prime factor in determining the characteristics of the presentation equipment to be used. The amount of presentation equipment required to accomplish the training objectives is determined by the expected usage of the courseware, the number and types of Military Occupational Specialties (MOS) in using units, the training time and training support resources available, and the scheduling of Skill Qualification Tests (SQT) for assigned personnel.

Pilot fielding of interactive video-disc courseware to units indicates favorable acceptance and usage levels. Additionally, 820 sets of EIDS hardware and interactive video disc courseware will be further validated in proponent institutional schools prior to unit fielding in FY 87. Only 960 sets of EIDS hardware are programmed for distribution for use by field units and other organizations in FY 87. Expected usage of lessons and hardware will be pre-determined and closely monitored for instructional effectiveness, user acceptance and product and hardware distribution efficiency. Should EIDS usage prove to be lower than projected, procurement levels will be appropriately reduced.

Courseware for technical and perishable skills will be developed and distributed first. A pull system, user demand supported, will be used rather than the push method used for the inital distribution of Training Extension Courses (TEC). The Electronic Information Delivery System (EIDS) permits instructional material to be delivered by interactive, individually-paced mode or as an instructor-controlled group presentation.

For these reasons, the fielding of EIDS is expected to provide the Army with a cost effective means to undertake sustainment training, especially for perishable and highly technical skills.

GAO note: Page references in this appendix have been changed to correspond to those in the final report.

APPENDIX IV

THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

MANPOWER, INSTALLATIONS AND LOGISTICS

16 MAY 1985

Mr. Frank C. Conahan
Director, National Security and
International Affairs Division
U.S. General Accounting Office
441 G. Street, NW
Washington, D.C. 20548

Dear Mr. Conahan:

Please find enclosed the Department of Defense (DoD) response to the draft GAO report, "Improvements Needed in the Army's Program for Developing Extension Training Materials for Use by Soldiers in Field Units", dated March 13, 1985 (GAO Code 967106, OSD Code 6559-A).

The report accurately identifies a series of related weaknesses in Army development and management of extension training materials. DoD agrees that these weaknesses could result in the creation of training materials which are not used sufficiently to justify the expense of their development and production. As the report indicates, the Army has taken several steps to correct these weaknesses. However, DoD agrees that further review and improvement of the process is in order to assure that all the necessary guidance is in place and that the training materials and the training support program are functioning properly to meet field needs. There is no question that a systematic evaluation and use of the evaluation results is essential to cost-effective extension training material development, production and use. The attachment to this letter discusses each of these issues in greater detail.

The same requirement for systematic evaluation of training materials, hardware, and plans applies to the Army video-disc system. The proper point for assessment of the video-disc field support program, however, is in FY89, after training materials and equipment become available for field use and evaluation, rather than FY87, which is before the materials and hardware are available for field use and evaluation.

APPENDIX IV

DoD appreciates your assistance in improving training support.

Sincerely,

Jerry L. Calhoun
Principal Deputy Assistant Secretary of Defense
(Manpower, Installations & Logistics)

GAO DRAFT REPORT

"Improvements Needed in the Army's Program for Developing Extension Training Materials for Use by Soldiers in Field Units"

GAO CODE 967106, OSD CASE 6559-A

DoD Comments on GAO FINDINGS AND RECOMMENDATIONS

FINDINGS

FINDING A: The Army Needs To Improve The Process For Developing Extension Training Materials. The GAO noted that the U.S. Army Training and Doctrine Command (TRADOC), through its Service schools, develops training materials for (1) resident school training of soldiers and (2) support of unit and individual soldier training--commonly referred to as extension training. The GAO also noted that the Army has initiated actions to improve its process for developing extension training materials by issuing guidance and an ongoing survey of several thousand soldiers. The GAO, however, found that TRADOC may be developing and revising extension training materials that are not needed or may not be used sufficiently to justify their cost. The GAO further found that several factors (1) the earlier Army attempt to eliminate half of the then existing materials, (2) the consistent indications of low usage of materials in the field, based on Army evaluations, and (3) the 16,000 different materials presently available and the thousands of extension training materials under development and programmed for future development, at a cost of many millions of dollars, indicate that improvements are necessary. The GAO concluded that unless improvements are made, TRADOC will continue to develop and revise extension training materials for which there is little assurance of need. (p.1 Letter and pp. 1, 5, Appendix I, GAO Report)
[See GAO note, p. 24.]
DoD Concurs. TRADOC has developed a new handbook (February 1985) for the development of extension training materials. The Army is reviewing these procedures for training materials development to assure the adequacy of the total process and of the resulting materials.

FINDING B: Low Use Of Training Materials Raises Questions About The Need For The Materials. The GAO found that data is not routinely collected on extension training materials usage; however, the Army has expressed concern over the large numbers of extension training materials, and several Army studies and audits conducted since 1979 have classified usage as low for the

Training Extension Course (TEC) lessons. The GAO further found that while the indicated low usage levels can raise questions about the need for these extension training materials, such low use cannot be attributed solely to a lack of need for training or for certain types of training materials, as none of the studies/audits specifically addressed the need for these extension training lessons or the reasons for the usage levels identified. However, the GAO concluded that the consistent results of the studies, surveys, and audits over the last 5 years showing low usage indicate the Army needs to (1) define what acceptable usage levels are, (2) obtain feedback on usage levels and reasons for the usage, and (3) use this information as appropriate to improve the method for deciding to develop materials and/or ensure necessary use by the soldiers. (pp. 1-2, Letter and pp. 3-5, Appendix I, GAO Report)

DoD Concurs. As a consequence of the Army review and improvement of its training materials development procedures, the Army must produce criteria for acceptable usage levels, include requirements to assess usage levels and reasons for the usage levels, and assure appropriate use of this feedback in improving the materials and their use.

FINDING C: Decisions To Develop Extension Training Materials Should Consider Actual Field Needs. Even though the December 1982 TRADOC guidance specified that the materials must be needed and wanted by field units, the GAO found that TRADOC's schools plan to spend millions of dollars developing thousands of extension training materials on the basis of a specified task analysis which does not specifically query field units regarding their need for these materials. The GAO further found that even though the TRADOC guidance states that an extension training material "should be developed only if it is required and meets the stated needs of field units," the procedure does not specify how the schools are to determine field needs and does not define an actual or a stated field need. The GAO also found that, except for those few instances when field units asked for training materials, the schools could not provide any documentation from trip reports or otherwise showing where actual training needs of field units had been identified from these sources. The GAO concluded that without field input on training needs, materials could be developed which are not needed or do not meet user needs. The GAO further concluded that the Army needs to define what the determination of field needs means, and establish procedures for obtaining this input so the schools can consider field needs when making decisions on developing training materials for them. (pp. 2-3 Letter and pp. 6-7, Appendix I GAO Report)

DoD Concurs. As a consequence of the Army review and improvement of its training materials development procedures, the Army must

clarify what field needs are, review existing procedures for adequacy of obtaining field input on training materials needs, and design and develop materials based on that input.

FINDING D: Improved Program Evaluation Is Needed For The Extension Training Materials Program. The GAO found that the Army does not routinely receive data on other extension training materials usage and effectiveness. The GAO reported that personnel at the schools stated they received some feedback on product effectiveness when visiting units; however, the GAO found that this does not constitute systematic feedback, and school personnel could not identify specific uses made of or actions taken on the usage data. The GAO concluded that there is a need for improved management evaluation of the training materials program and that systematic feedback on extension training materials to developers and managers could be very useful in future development efforts and in evaluating and improving the overall program effectiveness. GAO also concluded that Army needs to assure that lessons learned from usage of extension training materials previously fielded are considered before proceeding with its planned large scale effort to develop new materials, many of which are for new or revised occupational specialties related to systems under development. (p. 3 Letter and pp. 7-8, Appendix I, GAO Report)

DoD Concurs. The Army must obtain feedback on extension training materials as a component of its systematic assessment of the effectiveness of the total training program. As a consequence of the Army review and improvement of its training materials development procedures, the Army will assure that guidance on training materials evaluation is in place, that the feedback is considered in revising and developing training materials, and that program effectiveness is monitored.

FINDING E: Further Evaluation Is Needed Before The Army Buys And Fields New Video-Disc Equipment. The GAO reported that the Army plans to procure a new video-disc electronic information delivery system to replace existing paper and audiovisual delivery systems and to develop and convert training materials to video-disc for about $127.3 million in fiscal years 1984-1990. The GAO noted in its July 11, 1984 letter report to the Assistant Secretary of the Army for Manpower and Reserve Affairs (OSD Case 6559) expressing concerns about these planned expenditures, as over 80 percent of the 20,000 units were to be used by soldiers in the field and justification for the purchases did not include an analysis of past extension training materials usage. The GAO also noted that the DoD response to its letter report agreed that Army analysis of extension training material should be continuous. GAO concluded that the actions planned to further evaluate the need for large numbers of the video-disc equipment were steps in the right direction. However, GAO also concluded that the Army needs (1) to proceed cautiously and take advantage of the time available

prior to 1987, when fielding of the equipment is planned, to perform further field testing of the new equipment and (2) to incorporate the results of the needed management improvements in the program for developing extension training materials. The GAO further concluded that these results should be incorporated in the reevaluation of the need for large numbers of video-disc equipment. (pp. 3-5 Letter, pp. 9-16, Appendix I, Appendix II and Appendix III, GAO Report)

DoD Concurs. The Army will use the time in the interim to prepare for effective use of the technology and to develop effective processes to stimulate cost effective uses of both the new equipment and related training materials. The video-disc procurement will not take place until FY 1986, the courseware development will take as long as a year, and the first units will not be provided to field units until FY 1988. There will be a need for some training and development of related training materials prior to the actual fielding. The Army's evaluation of these needs will be thorough and continuous through the time of actual procurement. A full reevaluation of the program and training material needs, however, can not be conducted until FY 1989, after video-disc equipment is fielded and actual usage is determined. Any adjustment to either the equipment or training material purchases then can be accomplished beginning in FY 1989 or FY 1990, depending upon when the reevaluation can be completed.

RECOMMENDATIONS

RECOMMENDATION 1. The GAO recommended that the Secretary of the Army direct the Commander, US Army Training and Doctrine Command to develop criteria for what is to be considered an actual or a stated field need for extension training materials to include what are acceptable usage levels for the materials. (p. 5 Letter, GAO Report)

DoD Concurs. HQ TRADOC will be tasked immediately to begin developing criteria for identifying field needs and defining acceptable usage levels, along with appropriate procedures for improving usage levels, adjusting management or fielding practices to solve the problem, and/or revising the materials to meet the problem.

RECOMMENDATION 2. The GAO recommended that the Secretary of the Army direct the Commander, U.S. Army Training and Doctrine Command to delineate procedures in TRADOC guidance which specify (1) how school should obtain field input on actual needs and (2) how this input is to be used in developing materials. (p. 5 Letter, GAO Report)

DoD Concurs. HQ TRADOC will be tasked to review and improve its procedures for training materials development, assure the

adequacy of the total process, and assess periodically the adequacy of the resulting materials. This training materials development process will include procedures for obtaining field input on training materials needs and guidance on how this input will be used in developing materials. This review and improvement should be complete in 1986.

RECOMMENDATION 3. The GAO recommended that the Secretary of the Army direct the Commander, U.S. Army Training and Doctrine Command to obtain feedback on individual training materials usage and effectiveness for the purposes of incorporating lessons learned into the development of requirements for new extension training materials and determining the need to revise existing materials. (p. 5 Letter, GAO Report)

DoD Concurs. TRADOC will be tasked, as an element of its review of the process of identifying and meeting field training support needs, to assure the systematic checking of training materials use and effectiveness. TRADOC will also be tasked with the requirement to periodically assess the effectiveness of the feedback procedure in assuring materials and program effectiveness and efficiency.

RECOMMENDATION 4. The GAO recommended that the Secretary of the Army assure the Army's reevaluation of the planned 1987 procurement of new video-disc equipment units for field use includes consideration of (1) the usage levels for extension training materials and the reasons for such usage, and (2) the status of other management improvements needed in the program for developing such materials, such as the development of criteria defining acceptable usage levels and improvement in the criteria and procedures for determining field needs for extension training materials. (p. 5 Letter, GAO Report)

DoD Partially Concurs. The evaluation of video-disc materials, hardware, and applications in institutional training and in extension training will be thorough and continuous. The Army will use the time in the interim to prepare for effective use of the technology and develop effective processes to stimulate cost effective uses. Specifically, the Army will refine its video-disc development process during the fielding to the schools in FY 1986 and 1987 and develop written guidance for that process, to include the lessons learned from the evaluation of extension training materials. The Army also will develop detailed fielding plans for the video disc system that speak to resident and extension training material development, management, and use strategies.

Since video-disc procurement will not take place until FY 1986 and field units will not receive the equipment until FY 1988, field use of extension training video-disc materials can not be used to reevaluate the FY 1987 procurement as recommended by the

GAO. In addition, equipment provided to field units in FY 1988 will be contingent on courseware availability. However, an estimated 800 units will be available for FY 1988 field evaluation of usage levels and field effectiveness. The Army, therefore, will reassess its procurement plans in FY 1989 or FY 1990. (See response to Finding E.)

GAO note: Page references in this appendix have been changed to correspond to those in the final report.